REMARKS

Claim 1 has been amended to include the limitations of claim 52 and claim 52 has been canceled. Specifically, claim 1 has been amended to recite that the aggregate of nanofibers of the present invention has a morphology of a filament-yarn and/or a morphology of a spun yarn.

Claims 54 and 55 have been canceled as being cumulative with claim 7.

New claims 57-59 have been added to the application. Claim 57 recites that the aggregate of nanofibers of claim 1 is made of a polyphenylene sulfide resin. This limitation is supported by the description in the specification in the sentence bridging pages 18 and 19 and in Example 17. New claim 58 recites that the aggregate of nanofibers of claim 1 has an orientation that extends in one dimension over a definite length. This recitation is supported by the description on page 15, lines 1-3, of the specification. New claim 59 recites that the aggregate of nanofibers of claim 1 has an orientation that extends in one dimension for at least several meters. This limitation is supported by the description on page 15, line 8.

The Office is rejecting claims 1, 4, 7, 8, 12, 17, 52-53 and 55-56 under 35 U.S.C. § 103(a) as being unpatentable over Kawano

(U.S. Patent No. 4,966,808). The Office identifies Kawano as disclosing that "single fiber fineness by number average is in a range from 1 x 10^{-7} to 92 x 10^{-4} dtex (See Col 2, lines 10-25)".

Initially, it appears that "92 x 10^{-4} dtex" is intended to be "2 x 10^{-4} dtex". Regardless, however, the Office's interpretation of the description in Col. 2, lines 10-25, is not correct. In Col 2, lines 10-25, of Kawano it is described that fiber fineness is preferably 0.1-0.0001 denier, which is equal to 1.1 x 10^{-4} - 1.1 x 10^{-1} dtex. Example 1 of Kawano also discloses that the resulting micro-fibers have a fineness of 0.0001 to 0.1 denier. However, the range of fiber fineness of Kawano is not fiber fineness by number average as recited in claim 1 of the present application. It is apparent from the description of Example 1 of Kawano that the micro-fibers, per se, have a broad distribution of fiber fineness which has a range of 1.1 x 10^{-4} -1.1 x 10^{-1} dtex. That is, the finest fiber has a fineness of 1.1 x 10^{-4} dtex and the thickest fiber has a fineness of 1.1 x 10^{-1} dtex. Fiber fineness by number average is an average of such fibers.

It is noted that in Comparative Example 4 of the present invention, fiber fineness of the fibers is from 9 x 10^{-5} to 9 x 10^{-3} dtex, and fiber fineness by number average is 1 x 10^{-3} dtex. The range of fiber fineness of Kawano is larger than that of

Comparative Example 4 of the present invention. Therefore, it is clear that the fiber fineness of Kawano, in terms of number average, is greater than 1×10^{-3} dtex, which is much larger than the range of claim 1 of the present invention.

The above fact means that the aggregate of nanofibers of the present invention has a smaller fiber fineness by number average and a smaller spread of single fiber fineness than that of Kawano.

To obtain such an aggregate of nanofibers as recited in the present claims, the inventors made innovations in the method of producing the aggregate of nanofibers as described in the specification of the present application on page 28, line 20, to page 29, line 11. For example, the individual polymers are weighed separately and the polymers are fed separately into the mixer, in order to prevent uneven blending from occurring and to prevent the blend ratio from changing with time. Another innovation is using a twin-screw extrusion-kneader which comprises a kneading section of which the length is preferably set at 20% or more and 40% or less. Another innovation is the kneading section being disposed at a position near the discharge port of the twin-screw extruder thereby to shorten the residence time after kneading and to prevent reaggregation of the islands-part polymer.

On the other hand, Kawano does not disclose such a special

method for producing fibers. Kawano only discloses that "any conventional process for spinning a conjugate fiber of sheath-core type or side-by-side type may be employed". (Please refer to column 3, lines 18-21, of Kawano).

For the above reasons, the 35 U.S.C. § 103(a) rejection of the claims over Kawano is not proper and should be removed.

The Office is rejecting claims 1, 4, 7, 8, 10-12, 16-19 and 52-56 under 35 U.S.C. § 103(a) as being unpatentable over Buettner (U.S. Patent No. 6,740,142). It is stated in the Action that Buettner discloses that "[t]he fine fibers that comprise the nanofiber containing layer can have a diameter of about 0.001 to 2 micron. (See Col 3, lines 43-45) It is noted that applicant's disclosure defines 1×10^{-7} to 2×10^{-4} dtex in single fiber fineness to be equivalent to single fiber diameter from 1 to 150 nm. (See [0122])."

Indeed, Buettner discloses electrostatic solution spinning, also called electrospinning, as a method of making nanofibers and microfiber. Electrospinning has recently become known as a method for producing nanofibers. Submitted herewith is a document titled "Beaded nanofibers formed during electrospinning" (Polymer 40 (1999) 4585-4592) as a reference of electrospinning.

However, the aggregate of nanofibers of the present invention

as recited in the amended claims has a morphology of filament-yarn and/or a morphology of spun yarn. Herein, "a morphology of filament-yarn and/or a morphology of spun yarn" means such a state of an aggregate of a plurality of nanofibers being oriented one-dimensionally that continues over a definite length, such as in a multi-filament or spun yarn (page 14, last line, to page 15, line 3). On the other hand, nanofibers obtained by electrospinning do not have such morphology. Nanofibers obtained by electrospinning have the morphology of a two-dimensional aggregate where the nanofibers are disposed without any orientation. (Please refer to page 15, lines 4-6, of the present specification and "Beaded nanofibers formed during electrospinning" (submitted herewith, as noted above), and especially figures of "Beaded nanofibers formed during electrospinning"). That is, electrospinning is a method of spraying a solution of polymer under an electrical field, such that, although it can provide nanofibers which have small fiber fineness, it cannot provide an aggregate of nanofibers which has the morphology of filament-yarn and/or the morphology of spun yarn.

In addition, Buettner does not disclose a method for producing an aggregate of nanofibers as in the present invention which has a small spread of single fiber fineness. As shown in the figures of "Beaded nanofibers formed during electrospinning", fibers obtained

by electrospinning tend to have a broad spread of single fiber fineness. Therefore, Buettner does not disclose a method for producing the aggregate of nanofibers of the present invention.

For the above reasons, the 35 U.S.C. § 103(a) rejection of the claims over Buettner is also not proper and should be removed.

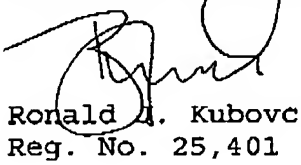
The foregoing is believed to be a complete and proper response to the Office Action dated June 5, 2008.

In the event that this paper is not considered to be timely filed, applicants hereby petition for an appropriate extension of time. The fee for any such extension may be charged to our Deposit Account No. 111833.

In the event any additional fees are required, please also charge our Deposit Account No. 111833.

Respectfully submitted,

KUBOVCIK & KUBOVCIK



Ronald J. Kubovcik
Reg. No. 25,401

Atty. Case No. IPE-056
Crystal Gateway 3
Suite 1105
1215 South Clark Street
Arlington, VA 22202
Tel: (703) 412-9494
Fax: (703) 412-9345
RJK/KTK/sbm